Miguel Costas

Curriculum Vitae, updated December 16, 2019

Trondheim, Norway
(+47) 469 67 251
(+34) 660 784 672
miguel.costas@ntnu.no
Birth date: 11.28.1987

Education

2011–2016 **PhD. in Civil Engineering, area of Continuum Mechanics and Structural Theory**, *School of Civil Engineering*, University of A Coruña.
Doctoral thesis: *Crashworthiness analysis and design optimization of hybrid impact energy absorbers* Research stay at SIMLab (NTNU) during six months, granted by Fundación Barrié. Extraordinary PhD. award, international mention and *cum laude* award.

2005–2010 **MEng. in Civil Engineering (Ingeniero de Caminos, Canales y Puertos)**, *School of Civil Engineering*, University of A Coruña.
Number 11 of 95 in class. Erasmus exchange program at Syddansk Universitet (Odense, Denmark).

2005 **Professional degree in Music**, *Conservatory of Santiago de Compostela*.
Specialization in piano and music analysis.

Work history

2017–Present **Postdoctoral researcher**, *Centre for Advanced Structural Analysis (CASA), NTNU (Trondheim, Norway)*.

2016 **Postdoctoral researcher**, *Structural Mechanics group, University of A Coruña*.

2011–2015 **RD engineer and PhD candidate**, *Structural Mechanics group, University of A Coruña*.

Summer 2009 **Internship**, *Port Authority of Vilagarcía de Arousa (Puertos del Estado)*.

Teaching experience

2018–Present **Teacher and coordinator of "Materials Mechanics" (TKT4135), master programmes**, *NTNU*.

2015–2018 **Teacher of "Advanced structural analysis" in the Master in Structural and Material Aerospace Engineering**, *School of Civil Engineering, UDC*.

2013–2014 **Assistant in the practical training of the subject 'Bridges 1'**, *School of Civil Engineering, UDC*.

Languages

Spanish	Native	
Galician	Native	
English	Full professional proficiency, level C1	*Certificate in Advanced English, Cambridge University. 2012.*
Norwegian	Intermediate professional proficiency, level B2-C1	
French	Basic professional proficiency, level B1	
Portuguese	Basic professional proficiency	

Computation skills

FEM Structural analysis with Abaqus Standard and Explicit including user material subroutines, LS-DYNA, Ansys, SAP2000, Cosmos/M.

Optimization packages Experience in structural optimization with different optimization libraries. Experience with DAKOTA and LS-OPT optimization frameworks.

CAD Autocad, Solidworks.

Programming Python, Fortran, Bash, LaTeX.

Other information

- Driving license. Car owner.
- Piano teacher and active professional concert pianist.

Patents

- National Spanish patent no. ES 2-386-269-B1: Hybrid metal-composite system for crash energy absorption. Authors: Alberto Tielas, Isabel Álvarez, Raquel Ledo (Centro Tecnolóxico da Automoción de Galicia, CTAG); Miguel Costas, Luis Esteban Romera (University of A Coruña, UDC). Granted on the 11th of July 2013.

RD fundraising – awarded projects

- [National project] DPI2016-76934-R. OPTISAFE. Probabilistic optimization of intact and damaged aeronautical structures under dynamic and impact loading. Spanish Ministry of Economy and Competitiveness. Year 2016. Budget: 111600 €.

Publications

Research articles in JCR journals.

Martin Kristoffersen, Miguel Costas, Tim Koenis, Vegard Brøtan, Christian O. Paulsen, and Tore Børvik. On the ballistic perforation resistance of additive manufactured alsi10mg aluminium plates. *International Journal of Impact Engineering*, page 103476, 2019.

M. Costas, D. Morin, M. de Lucio, and M. Langseth. Testing and simulation of additively manufactured AlSi10Mg boxes under quasi-static lateral compression [under review] . *European Journal of Mechanics / Solids*, 2019.

A. Muñoz-Ibáñez, J. Delgado-Martín, M. Costas, J. Rabuñal-Dopico, J. Alvarellos-Iglesias, and J. Canal-Vila. Pure mode-I fracture toughness determination in rocks using a pseudo-compact tension (pCT) test approach [under review] . *Rock Mechanics and Rock Engineering*, 2019.

M. Costas, D. Morin, O.S. Hopperstad, T. Børvik, and M. Langseth. A through-thickness damage regularisation scheme for shell elements subjected to severe bending and membrane deformations. *Journal of the Mechanics and Physics of Solids*, 123:190 – 206, 2019.

M. Costas, D. Morin, M. Langseth, J. Díaz, and L. Romera. Static crushing of aluminium tubes filled with PET foam and a GFRP skeleton. Numerical modelling and multiobjective optimization. *International Journal of Mechanical Sciences*, 131-132:205 – 217, 2017.

M. Costas, D. Morin, M. Langseth, L. Romera, and J. Díaz. Axial crushing of aluminum extrusions filled with PET foam and GFRP. An experimental investigation. *Thin-Walled Structures*, 99:45–57, 2016.

J Paz, J Díaz, L Romera, and M Costas. Size and shape optimization of aluminum tubes with GFRP honeycomb reinforcements for crashworthy aircraft structures. *Composite Structures*, 133:499–507, 2015.

M. Cid Montoya, M. Costas, J. Díaz, L. E. Romera, and S. Hernández. A multi-objective reliability-based optimization of the crashworthiness of a metallic-GFRP impact absorber using hybrid approximations. *Structural and Multidisciplinary Optimization*, 52(4):827–843, 2015.

J. Paz, J. Díaz, L. Romera, and M. Costas. Crushing analysis and multi-objective crashworthiness optimization of GFRP honeycomb-filled energy absorption devices. *Finite Elements in Analysis and Design*, 91:30 – 39, 2014.

M. Costas, J. Díaz, L. Romera, and S. Hernández. A multi-objective surrogate-based optimization of the crashworthiness of a hybrid impact absorber. *International Journal of Mechanical Sciences*, 88:46–54, 2014.

M. Costas, J. Díaz, L. E. Romera, S. Hernández, and A. Tielas. Static and dynamic axial crushing analysis of car frontal impact hybrid absorbers. *International Journal of Impact Engineering*, 62:166–181, 2013.

Book chapters.

Jacobo Díaz and Miguel Costas. Crashworthiness. In Holm Altenbach and Andreas Öchsner, editors, *Encyclopedia of Continuum Mechanics*, Berlin, Heidelberg, 2019. Springer Berlin Heidelberg.

International conferences.

M. Costas, D. Morin, and M. Langseth. An experimental and numerical study on the lateral crushing of additively manufactured AlSi10Mg boxes. In *European Conference on the Structural Integrity of Additively Manufactured Materials, Trondheim (Norway)*, 2019.

M. Kristoffersen, M. Costas, C. Oen Paulsen, T. Koenis, V. Brøtan, and T. Børvik. Experimental and numerical investigations of additively manufactured AlSi10Mg plates subjected to ballistic perforation. In *European Conference on the Structural Integrity of Additively Manufactured Materials, Trondheim (Norway)*, 2019.

M. Costas, D. Morin, and M. Langseth. Modelling and simulation of impact in stiffened aluminium panels using damage regularisation. In *ASIDIC2019, Aerospace Structural Impact Dynamics International Conference, Madrid (Spain)*, 2019.

M. Costas, D. Morin, and M. Langseth. Modelling of steel-aluminium components using structural adhesive and self-piercing rivets. In *12th European LS-DYNA Conference, Koblenz (Germany)*, 2019.

D. Morin, M. Reil, T. Berstad, M. Costas, and M. Langseth. Multi-scale numerical simulations of structural joints with flow-drill screws using a virtual material calibration. In *12th European LS-DYNA Conference, Koblenz (Germany)*, 2019.

D. Morin, T. Berstad, M. Costas, O.S. Hopperstad, and M. Langseth. *MAT_258: A through-thickness regularization scheme for shell element analyses – application to aluminium components. In *12th European LS-DYNA Conference, Koblenz (Germany)*, 2019.

J.K. Holmen, J. Johnsen, M. Costas, D. Morin, T. Berstad, T. Børvik, O.S. Hopperstad, and M. Langseth. Applications of *MAT_258: A through-thickness regularization model for shells. In *Dynamore Nordic Users' Conference 2018, Gothenburg (Sweden)*, 2018.

D. Morin, J.K. Holmen, J. Johnsen, M. Costas, T. Berstad, T. Børvik, O.S. Hopperstad, and M. Langseth. Theoretical aspects of *MAT_258: A through-thickness regularization model for shells. In *Dynamore Nordic Users' Conference 2018, Gothenburg (Sweden)*, 2018.

J. Díaz, L. E. Romera, M. Costas, and J. Paz. Reliability-based crashworthiness optimization of hybrid metal-composite energy absorption devices. In *ICCS19 - 19th International Conference on Composite Structures, Porto (Portugal)*, 2016.

L. Romera, L. Pire, M. Costas, J. Paz, J. Díaz, and S. Hernández. Improvement of crash forces in structures using optimization tools. In *HPSM/OPTI 2016, International Conference on High Performance and Optimum Design of Structures and Materials. Siena (Italy)*, 2016.

M. Costas, J. Díaz, L. E. Romera, D. Morin, and M. Langseth. Experimental characterization and numerical multi-objective optimization of the crashworthiness of aluminum extrusions filled with PET foam and GFRP. In *1st International Conference on Impact Loading of Structures and Materials (ICILSM), Turin (Italy)*, 2016.

J. Díaz, L. E. Romera, J. Paz, and M. Costas. Crashworthiness optimization of metal-composite energy absorption devices. In *ICCS18 - 18th International Conference on Composite Structures, Lisbon (Portugal)*, 2015.

L. Romera, M. Costas, J. Díaz, J. Paz, and S. Hernández. Reduction of the frontal crash peak forces in a car using size optimization tools. In *35th FISITA World Automotive Congress, Maastrich (Netherlands)*, 2014.

J. Díaz, M. Costas, L. Romera, J. Paz, and S. Hernández. Surrogate-based multi-objective optimization of glass-fiber - steel crash absorbers. In *35th FISITA World Automotive Congress, Maastrich (Netherlands)*, 2014.

L. Romera, S. Hernández, M. Costas, A. Balomir, and P. Ouro. Assessment of seismic behaviour of portal bridges with double friction pendulum bearings. In *7th IABSE Symphosium, Madrid (Spain)*, 2014.

L. Romera, J. Paz, M. Costas, J. Díaz, and S. Hernández. Crashworthiness response of honeycomb metallic-GFRP energy abpsortion devices. In *HPSM/OPTI 2014, The 2014 International Conference on High Performance and Optimum Design of Structures and Materials*, 2014.

M. Costas, L. Romera, J. Díaz, S. Hernández, and A. Tielas. Computational and experimental analysis of a hybrid car impact absorber. In *Computational Methods and Experimental Measurements XVI, WIT Press, C.A. Brebbia, G. M. Carlomagno and S. Hernandez (eds.)*, pages 367–378, 2013.

M. Costas, J. Díaz, L. Romera, S. Hernández, and R. Ledo. Influence of welded joints on the crashworthiness response of hybrid structural elements. In *SAE 2013 World Congress and Exhibition, paper 13B-0036/2013-01-0755*, 2013.

International research stays

- Research stay from 1/10/2014 to 1/4/2015 (six months) at the Structural Impact Laboratory (NTNU, Norway) supervised by Prof. Magnus Langseth and Dr. David Morin.

Scientific advisory

- Reviewer in JCR journals *International Journal of Mechanical Sciences*, *Materials and Design*, *Journal of Reinforced Plastics and Composites*, *Engineering Optimization*, *Computers and Structures*, *Composites Part B*, *Thin-Walled Structures*, and *International Journal of Impact Engineering*.
- External advisor, Group of Structural Mechanics, University of A Coruña.
- Opponent in PhD thesis committees at: THe University of Edinburgh (2019)